TABLE 3.—*Maximum free-air wind velocities (m. p. s.), for different sections of the United States, based on pilot-balloon observations during June 1943*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	38.9	wnw.	2,280	5	Portland, Maine	46.0	wnw.	5,000	6	Caribou, Maine	64.0	nnw.	8,790	14	Caribou, Maine.
East-Central [2]	31.1	w.	2,420	12	Huntington, W. Va.	30.2	w.	5,000	30	Washington, D. C.	31.0	w.	7,550	30	Huntington, W. Va.
Southeast [3]	24.0	ssw.	2,090	27	Charleston, S. C.	20.8	wnw.	4,660	9	Spartanburg, S. C.	26.4	n.	10,180	29	Key West, Fla.
North-Central [4]	37.9	wsw.	1,950	1	Detroit, Mich.	44.0	w.	4,900	4	Sault Ste. Marie, Mich.	69.0	wnw.	11,810	29	Bismark, N. Dak.
Central [5]	32.4	sw.	1,230	1	Wichita, Kans.	38.5	wsw.	5,000	1	Omaha, Nebr.	60.0	sw.	6,180	3	Sioux City, Iowa.
South-Central [6]	28.2	wsw.	1,520	2	Amarillo, Tex.	32.8	sw.	4,970	2	Amarillo, Tex.	36.0	wsw.	9,020	3	Amarillo, Tex.
Northwest [7]	38.2	nw.	1,740	7	Great Falls, Mont.	35.0	sw.	4,780	23	Billings, Mont.	68.0	sw.	8,740	25	Billings, Mont.
											68.0	ssw.	9,640	24	Burns, Oreg.
West-Central [8]	42.6	sw.	2,240	22	Casper, Wyo.	56.2	ssw.	3,800	21	Ely, Nev.	75.0	nw.	9,780	2	Reading, Calif.
Southwest [9]	28.7	ssw.	1,910	12	Roswell, N. Mex.	49.5	wsw.	4,200	2	Raton, N. Mex.	58.0	w.	5,320	3	Albuquerque, N. Mex.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, Southern Ohio, Kentucky, Eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and Western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, Northern Nevada, and Northern California.
[9] Southern California, Southern Nevada, Arizona, New Mexico, and extreme West Texas.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

Following a month of excessive precipitation and disastrous flooding in the interior of the country in May, the area of above-normal precipitation during June shifted slightly northward and westward. All States from the Rocky Mountains westward, except Arizona, had above-normal amounts, Utah having nearly four times the normal. East of the Rockies, most States north of the 36° latitude had above normal; the exceptions were Indiana, the upper Ohio Valley, the northern Appalachian Region and portions of the Middle Atlantic States.

Excessive flooding occurred in northeast Texas, Kansas, Nebraska, Montana, Minnesota, Iowa, Missouri, Wisconsin, and northern New England. On the other hand, river stages during June were generally considerably below normal in the southern tier of States from Arizona to Florida, except in the lower Mississippi River.

Atlantic Slope drainage.—Heavy rains on June 15–16 caused destructive floods in the upper Connecticut River Basin, and in the headwaters of the Androscoggin and Kennebec Rivers in Maine. The rainfall was in the form of heavy thundershowers which occurred almost entirely within a 24-hour period. In the Connecticut Basin above North Stratford, N. H., the rainfall ranged from 1 to nearly 5 inches. The Connecticut River reached a stage of 14.65 feet at North Stratford on the night of the 16th, exceeding the previous high stage of record, 14.6 feet in March 1936. Flood stage was not exceeded downstream from that point.

Heavy rains on June 1–2 over the upper Susquehanna River Basin caused slight overflows in the Chenango River at Sherburne, N. Y., and in the Susquehanna River at Oneonta, N. Y.

Light to moderate flooding in the Neuse River at Smithfield and Goldsboro, N. C., on June 9–16 resulted from heavy showers and thunderstorms on June 8–9. In the middle portion of the Neuse Basin the precipitation ranged from 1.25 to more than 4.5 inches.

Upper Mississippi Basin.—Abnormally heavy rainfall during May continued into June in most of the upper Mississippi River watershed and caused high stages with flooding generally in the tributaries and the main river during June. The Minnesota River, the Chippewa, Black, and Wisconsin Rivers in Wisconsin, the Raccoon and Des Moines Rivers in Iowa, and the Salt and Meramec Rivers in Missouri were the principal tributaries in flood. The Illinois River, which was in record flood in May continued above flood stage through most of June, and at Beardstown, Ill., the river did not recede to bankful until July 2.

The main Mississippi River was in moderate to severe flood from the headwaters to the mouth of the Ohio River. At St. Louis, the Missouri River flood waters combined with the high water in the Mississippi River to produce a crest of 35.2 feet at St. Louis on June 26, only 3.7 feet below the high flood crest of May 24.

The following report of the June flood in the headwaters of the Mississippi watershed above Hastings, Minn., is submitted by the official in charge, Weather Bureau office, Minneapolis, Minn.:

> Abnormally heavy rainfalls throughout the month of May continued during June over this basin and as a result the river was in flood for an unusually long period of time. The average rainfall for May, as determined from 18 stations in the headwaters basin, was 5.12 inches, or 2.13 inches above normal. For the month of June the average rainfall was 6.21 inches or 2.15 inches above normal. The run-off of the Rum River and the Mississippi River at Anoka, Minn., a few miles above Minneapolis, exceeded any June of record. However, the flood stage was not reached at Minneapolis, but was almost attained at St. Paul. The Minnesota River contributed a high discharge into the Mississippi River above the St. Paul gage as the United States Geological Survey records reveal that the peak discharge of the Minnesota River at Carver, Minn., was close to the maximum record of 23,000 c. f. s.
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> Cautionary river forecasts were issued on June 4 for the Twin Cities and on June 15 for the Mississippi River from Little Falls to Hastings Dam and for the Minnesota River from New Ulm to Mendota, Minn. Damage was mainly agricultural because the lowlands along the streams were inundated. Early seeded crops were destroyed, pasture lands were reduced and damaged, and much difficulty was experienced in the care of livestock and poultry. The total losses, practically all to prospective crops, has been placed at $100,000. Savings as a result of the advisory warnings and daily advices to inquirers is placed at $25,000.

Missouri Basin.—Heavy rains occurred over most of Montana on June 2–3, and over the north central portion about the middle of the month. Largely as a result of the latter rains, floods occurred in the Marias, Teton, Musselshell, portions of the Yellowstone, and in the Missouri

River in the vicinity of Fort Benton, Mont., with the highest stages for a number of years being observed.

Rainfall averaging about 2 inches in the Big Sioux River Basin from above Sioux Falls, S. Dak., to below Akron, Iowa, and also in the Rock River tributary in mid-June, caused considerable overflow from Sioux Falls to above Sioux City, Iowa. Some overflow also occurred in the James, Vermillion, and Floyd Rivers.

Excessive rainfall in the vicinity of Omaha, Nebr., on June 2–3, resulted in a flash flood in Papillion Creek. Damage caused by the rainfall and overflow has been estimated at about $350,000.

Frequent heavy rains over the Kansas River Basin beginning on June 5 and continuing until June 16 caused damaging floods in much of the basin. The greatest damage occurred along the main Kansas River with two distinct overflows. The second crested at Topeka, Kans., at 26.75 feet on June 17, the highest since June 1935. Below Le Compton, Kans., the stages exceeded the flood of 1935.

In addition to great crop losses in the Kansas Basin railway service was interrupted for a few days from Manhattan, Kans., through Topeka to Lawrence, Kans., and highways between those points were flooded. Dykes in the vicinity of Lawrence were broken with much damage to lowlands.

The Republican River overflowed its banks between Scandia, Kans., and the mouth from June 11 to 18.

The Big Blue and Solomon Rivers overflowed twice, the Big Blue from Beatrice, Nebr., to its mouth and the Solomon in the vicinity of Beloit, Kans.

Heavy rains on June 15–16 caused overflows in the Delaware and Big Stranger Rivers in Kansas, the Little Platte in Missouri, and the Nemaha in Nebraska, and in the Missouri River from Nebraska City, Nebr., downstream. At Kansas City a stage of 29.1 feet was reached on June 18–19, the highest stage since 1908. Approximately a third of the discharge in the Missouri at Kansas City was contributed by the Kansas River. Below Kansas City, serious dyke breaks occurred and flooded much farmland, inflicting serious damage to buildings, bridges, highways, and crops.

The upper Osage River in Kansas exceded flood stage on four occasions during the month, but only light flooding occurred below the Kansas-Missouri line. Moderately severe flood conditions prevailed in the Grand River from Gallatin, Mo., to the mouth.

Arkansas Basin.—Moderate overflows occurred in the Neosho River from Council Grove to Oswego, Kans., from June 16 to 27 and a slight overflow in the Arkansas River between Fort Smith and Dardanelle, Ark., on June 8 and 9.

Red Basin.—Except for light flooding in the Ouachita River at Arkadelphia, Ark., on June 1, and in the Sulphur River at Hagansport and Naples, Tex., on June 7–17, stages in the Red Basin were generally well below normal.

Lower Mississippi Basin.—The St. Francis River, which reached flood stage in May, continued in flood through most of June.

The extensive flooding during May in the Missouri, Ohio, Arkansas, and White River Basins produced above-flood stage in the lower Mississippi to its mouth. The crest reached New Orleans, La., on June 12 at a stage of 18.2 feet, 1.2 feet above flood stage. The flooding during May and June in the Mississippi System will be discussed in more detail in a later issue of the REVIEW.

West Gulf of Mexico drainage.—Excessive rains over the upper Sabine watershed on June 6 caused the highest stages of record in the upper portions and flooded lowlands south of Logansport, La., to below Milam, Tex., where the flood finally flattened out to within the confines of the river banks.

Kaufman, Tex., south of the Sabine Basin, reported 9.18 inches of rainfall for the week ending June 8, and unofficial rainfall reports indicate that the Grand Saline, Tex., area had more than 13 inches of precipitation on June 6.

On June 7 the water at Grand Saline reached the highest point ever known and on June 8 the peak stage near Mineola, Tex., was 24.4 feet, 3.8 feet above the maximum known stage according to the United States Geological Survey. This peak reached Gladewater, Tex., on June 11, with a stage of 41.2 feet. The highest previous stage known was 39.4 feet in January 1932.

By June 19 the river was above flood stage, 25 feet, at Logansport, La., with the gage reading 27.2 feet, and remained above flood stage there until July 1. The crest at Logansport was 33.4 feet on June 21–22, considerably below the maximum stage of 39.4 feet which occurred in May 1884. At Bon Wier, Tex., the river rose to only 0.3 foot above flood stage.

Floods in the upper Trinity River Basin were produced by unusually heavy rains which fell over the East Fork of the Trinity drainage and the main Trinity from below Dallas, Tex., to near Trinidad, Tex., on June 5–6. The greatest damage occurred from the rapid rise and overflows in the small tributaries of the East Fork. Flood stage was exceeded by 4 feet in the East Fork at Rockwall Tex., on June 6. Slightly over 10 inches of rain occurred at Rockwall between 8:30 p. m. June 5 and 7:30 a. m. June 6. The main Trinity overflowed along its entire length downstream to Liberty, Tex., where the crest just reached flood stage, 24 feet, on June 24–25.

Pacific Slope drainage.—Tulare Lake reached its highest elevation on June 10–11 at 196.08 feet. River flow was moderately high at the beginning of the month, 9.2 feet (flood stage 10 feet) at Piedra, Calif., on the Kings River on June 1, but subsided under the influence of subnormal temperatures and remained at moderate stages the remainder of the month.

The flooded area continued to enlarge as additional water overflowed through breaks in the lake levees until a total of 112,000 acres were covered by water. After June 11, the elevation of the lake fell gradually to 195.67 feet on June 28. It is estimated that an additional loss to crops and farm lands of $250,000 occurred during the month.

The Columbia River rose, exceeding flood stage during the month in the lower portion from The Dalles, Oreg., downstream. The highest stage reached during June was 19.8 feet at Portland, Oreg., on June 24 and 19.9 feet at Vancouver Wash., on June 23–24. A further report will be made in the next issue of the REVIEW.